

Notice of Allowability

Application No.

10/743,608

Examiner

Steven J. Fulk

Applicant(s)

NAM, SANG WOO

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 7/5/06.
2. ☒ The allowed claim(s) is/are 1 and 2.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


BRADLEY K. SMITH
PRIMARY EXAMINER

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see pages 3-4, filed July 5, 2006, with respect to the rejection of claims 1 and 2 under 35 U.S.C. 103(a) have been fully considered and are persuasive. The rejection of claims 1 and 2 has been withdrawn.

Allowable Subject Matter

2. Claims 1 and 2 are allowed.

3. The following is a statement of reasons for the indication of allowable subject matter: a search of the prior art failed to disclose or reasonably suggest a method for forming a capacitor and a contact hole of a semiconductor device simultaneously, comprising the steps of depositing a metal layer and a TiN layer directly on the metal layer, patterning the layers to make a contact hole part and a capacitor part with the metal layer and the TiN layer as the lower metal layer of the capacitor, forming an insulating layer and an ILD layer over the insulating layer, removing the ILD over the capacitor part and the contact hole part, and removing the insulating layer and TiN layer over the contact hole part, as recited in claim 1.

Tsau '306 discloses a method of forming a capacitor and a contact hole of a semiconductor device simultaneously, wherein a TiN layer is formed under a metal layer, but the reference does not disclose forming a TiN layer directly on top of the metal layer and removing the TiN layer in the contact hole part.

Lee et al. '135 discloses a method of forming a capacitor and a contact hole of a semiconductor device simultaneously, wherein a TiN layer is formed over a

metal layer, but the TiN layer is removed in both the capacitor part and the contact hole part and thus does not form the lower metal layer of the capacitor.

Adler et al. '128, Ma et al. '234 and Sung et al. '454 discloses methods of simultaneously forming a metal-insulator-metal capacitor and a contact via hole, but the insulator layer of the capacitor is formed over the ILD layer.

Shao et al. '747, Gambino et al. '423 and Sun '629 disclose methods of simultaneously forming a metal-insulator-metal capacitor and a contact via hole, but no TiN barrier layer is formed over the metal layer.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven J. Fulk whose telephone number is (571) 272-8323. The examiner can normally be reached on Monday through Friday, 9:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Art Unit: 2891

5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Steven J. Fulk
Patent Examiner
Art Unit 2891

September 8, 2006



BRADLEY K. SMITH
PRIMARY EXAMINER